

Role of Mothers in Prevention of Dental Caries: A Systematic Review

Research Article

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Abstract

Mothers play an important role in prevention of dental caries. The contributing factors including transmission of infection from mothers having dental caries to children, breastfeeding, weaning, snacking habits of children, brushing techniques and routine dental health visits of child are all preventable factors. If a mother is educated and well aware about these factors then she would be able to apply preventive strategies at the right time. The objective of this study is to find scientific evidences regarding role of mothers in caries prevention. MEDLINE database were used and relevant articles were searched, important internet sites were visited, technical books and various international publications were reviewed. References cited in the selected articles were also reviewed and included. The study concluded that there are scientific evidences proving mother to child transmission of cariogenic bacteria. To avoid these contributing risk factors of dental caries mothers need to improve their oral health especially in pregnancy, breast feed the child appropriately and avoid excessive nocturnal breast feeding, avoid too much sugary weaning food and sugary snacks consumption in young children. There should be regular routine dental visits of mother and child.

Keywords: Role of mothers; Dental caries; Dietary habits; Prevention; Cariogenic bacteria; Nocturnal breast feeding; Cariogenicity; Xylitol

Abbreviations: FDA: Food and Drug Administration; C.F.U: Colony Forming Units; AAPD: American Academy of Pediatric Dentistry; WHO: World Health Organization; ECC: Early Childhood Caries; DMFT: Decayed Missing and Filled Teeth

Introduction

The mothers' role of preventing dental caries starts when the child is in mother's womb this can easily be prevented through early detection of oral health problems through screening in early pregnancy and applying prompt treatment at right time so that transmission of infection from mothers to child can be prevented. Routine dental checkups during pregnancy and use of fluorides and chlorhexidine are found to be effective preventive strategies in inhibiting the transmission of cariogenic bacteria from mother to child [1]. The mothers are considered to be the primary care giver of the children. The mothers acquiring cariogenic bacteria, having improper dietary practices are at increased risk of developing caries. The mothers must adopt preventive dental approach before conception which includes; use of fluorides that reduces the caries process, and utilization of routine preventive dental care. During pregnancy provision of optimal dental care is important and should be given safely and effectively. The US food and drug administration (FDA) categorized fluoride in category C [2]. The C category drugs are generally considered safe but information from well-controlled human studies is limited. The topical fluoride gel may cause nausea, so application of fluoride varnish is recommended due to its better tolerance. The use of fluoride in pregnancy must follow the evidence based guidelines [3]. A study conducted on effectiveness of 0.05% sodium fluoride and 0.12% chlorhexidine mouth rinse daily for 6 months of pregnancy and 24 months after delivery showed significant results and combination of both the drugs found effective [4,5]. The mode of action is

different of these two medications but their combined therapy produces synergistic effect on mutant streptococci [5]. The other medication like Xylitol and chlorhexidine use reduces maternal oral bacterial load and reduce the vertical transmission of bacteria to infants when used late in pregnancy and in postpartum period. Both topical agents are considered safe in pregnancy and during breastfeeding [6]. The chewing gums containing high dose of Xylitol is found to have beneficial effects on reducing the plaque pH and MS saliva concentration [7]. A study conducted in North Carolina first established the association of periodontal disease with low birth weight and preterm birth which was previously neglected. There are numerous factors previously identified for Low birth weight and preterm babies but this study after adjusting with possible confounder reached to the conclusion and given an insight to future research [8].

Improvement of Oral Health During Pregnancy

The two most prevalent diseases of the mouth among women during pregnancy are periodontal disease and dental caries influencing mothers' oral health status and increasing the risk of atherosclerosis [9-12]. The mother is found to be a primary source of infection of dental caries for her children. The source of infection is Mutans streptococcus found in mother's saliva [13-17] and usually detected in infants' mouth after primary tooth eruption [18,19]. Research studies have shown that mothers with high concentrations of salivary mutans streptococci are at high risk of transmitting infection to their children as compared to mothers with low levels of salivary mutans streptococci and their children are at a greater risk of developing a large number of carious lesions in the primary dentition at a young age [20-24]. The threshold level of greater than or equal to 10^6 colony-forming-units (C.F.U.) per ml streptococcus mutans in mothers

are considered at high risk for transmitting caries to their children and it is advised to mothers that the streptococcus mutans salivary level below 3×10^5 c.f.u. per ml should be maintained for inhibiting transmission of bacteria to infants [21]. The transmission occurs through several daily saliva contacts between the mother and child contacts [21]. The mothers are required to take care of their oral health during pregnancy and utilize routine dental health care to detect their oral health problems early so that timely interventions will reduce the risk of caries and break the chain of transmission of bacteria to the new born child.

Infant's Oral Health and Mothers Feeding Practices

Infants oral health is significantly associated with on demand prolonged nocturnal breast-feeding, prolonged use of baby bottles containing fermentable and sugary liquids [25-29]. Continuous use of sweetened pacifier and early weaning of sugary foods are the most common habits that affects the infant oral health in general and specifically leads to early childhood caries [29-31]. The American Academy of Pediatric Dentistry (AAPD) declared that breastfed and bottle-fed infants are at a potentially devastating risk for caries due to breastfeeding. This is related to prolonged and repetitive feeding without proper oral hygiene, and is also related to the fact that parents are encouraged to offer their infants beverages in drinking cups before their first year of life and to stop bottle-feeding them between 12 and 14 months of life [32]. This recommendation should be interpreted with caution because the potential overall benefits of breast feeding are very well documented by World Health Organization (WHO), recommended to maintain breastfeeding up to the second year of life or longer [33]. And the studies proved breast feeding is associated with early childhood caries did not deal with the confounder variables. By discouraging prolonged breastfeeding and breastfeeding on demand the benefits of breast feeding will not be achieved [34]. The American Academy of Pediatrics emphasized that infants who are put to bed with the bottle or who breastfeed during the night are at great risk for dental caries [35,36]. Apart from the presumable cariogenicity of breast milk, it is an important issue to overlook and deprive the children from the major nutritional source in their first year of life [37,38]. Mothers should breastfeed their children as it is a major source of nutrition to the infant and take necessary precaution of infants' oral health from example proper cleaning of the mouth and avoid prolonged nocturnal breast feeding. To avoid side effects of nocturnal breast feeding it is recommended that infants should not be put to bed with the baby bottle and that ad libitum breastfeeding at night should be avoided after the eruption of the first tooth [39].

Role of Mothers in Prevention of Early Childhood Caries and Dietary Habits of Children

Healthy feeding habit is necessary for the proper growth and development of children. The World Health Organization has recommended that healthy diet and proper feeding habits have important role in prevention of oral diseases including; early childhood caries, dental caries, dental erosion, defects in development, diseases of the oral mucosa and periodontal diseases [40]. The excessive consumption of carbohydrates has an unfavorable effect on dental health status of the children [41]. Usually the pattern of sugar consumption increases during the first two years of children life and various research studies conducted on feeding habits and sugar intake among children

established the fact that it promotes early childhood caries (ECC). However it has been reported in few research studies that actually it is the interplay of multiple factors which is found to be associated with ECC and it remains controversial finding [42-44]. The frequent intake of sugary snacks has also been associated with ECC [45,46]. Whilst few studies reported that this association has not been established and requires further epidemiological research with strong design and analysis to prove this fact [47-49]. The early childhood caries burden varies among different communities and it is found high in disadvantaged and underprivileged communities [50-57]. The snacking habit found different in low and high income groups. The low income group consumed potato chips, fried potatoes, fruit drinks and whole milk. Whilst high income group consumed more grain-based salty snacks, fruits, skim milk, soft drinks, coffee and tea [58]. A study from Pakistan showed that ECC was found in 23.5% of children 1-71 months old with mean decayed missing and filled teeth (DMFT) of 0.67 and the factors identified were age of the child, mother educational and occupational status, sweetened drink consumption at night and not utilizing routine dental health care services [59]. Another study from Karachi Pakistan reported that majority (82%) of mothers having improper brushing technique [60]. The role of dietary and lifestyle factors are very important because the future targeted caries prevention programs depend upon the understanding of these factors. These factors are under the control of mothers and if she possesses adequate knowledge regarding brushing technique and healthy diet can provide best oral preventive health care to their children.

Conclusion and Future Direction

The mothers play a crucial role in prevention of dental caries among children. Reducing the total number of cariogenic bacteria in the oral environment is an important factor in preventing and controlling caries. The relationship of maternal and child experience with dental caries is well established by scientific studies. Therefore women should be educated about routine oral dental visits during pregnancy, appropriate breast feeding like avoid prolonged breast feeding at night and not to wean too much sugary foods to children, paying attention to healthy snacking habits of child, appropriate brushing techniques and children routine dental visits for early detection and prompt treatment of caries. Daily tooth brushing with fluoridated toothpaste and tooth brushing before going to bed are important measures for the control of caries, since they maintain the concentration of fluoride in the saliva for a longer period. The government should provide basic routine dental health care services to vulnerable women and children at low cost and make these services accessible to mothers. The other strategy includes; regular and effective home care for periodontal disease and use of fluorides and sealants for caries. The pregnancy is itself a "teachable moment" in self-care and future child-care, dental health education should be a part of antenatal checkups. The priority should be given to mothers who have suffered from dental caries so that they can effectively prevent transmission of disease to their children.

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